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2011 Addendum to Second Five Year Review Report,
Bremerton Naval Complex
Dated 21 October 2007

A Five-Year Review addendum is generally completed for remedies where the protectiveness determination is deferred until further information is obtained. When deferring protectiveness in the Five-Year Review report, the Navy, as lead agency, typically provides a timeframe for when the information will be obtained and a protectiveness statement can be made. This addendum documents progress since the Second Five-Year Review for Bremerton Naval Complex, provides additional recommendations, and provides a revised protectiveness determination for the OU B Marine remedy, which was deferred in the Second Five-Year Review.

The Second Five-Year Review report for the Bremerton Naval Complex (BNC) in Bremerton, WA, was signed by Captain R.S. Tanaka, Commanding Officer, Naval Base Kitsap on 21 October 2007. The protectiveness statements at that time were as follows:

> The remedies implemented at Operable Unit (OU) A, OU NSC, and OU B Terrestrial remains protective of human health and the environment in the short term. Exposure pathways and infiltration pathways that could increase migration of chemicals of concern (COCs) and that could result in unacceptable risks are being controlled and monitored. The conditions and COC concentrations found today in groundwater are similar to those at the time the Records of Decision (RODs) were executed, when conditions were found not to pose unacceptable risks to human health and the environment as long as exposures and COC migration were controlled. Future protectiveness will be assessed based on continued monitoring of COC concentrations and trend analysis. To ensure long-term protectiveness at these OUs, follow-up actions are needed, as documented in the Report.
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> Actions taken by the City of Bremerton in developing the park at OU D, including grading, utility installation, and landscaping, appears to have altered the low-permeability cap included in the original remedy. In the short term, there is no evidence of release from the site, and the hardscaping features may provide protectiveness similar to that offered by the low-permeability cap. In lieu of detailed information regarding the City's actions, data from ongoing groundwater and marine sediment monitoring will be reviewed as a check on the long-term protectiveness of current site conditions.
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> The protectiveness of the remedy implemented at OU B Marine cannot be fully assessed until data from the 2007 marine monitoring event are available and additional review of information regarding Sinclair Inlet rockfish has been performed. These data should be collected and analyzed and an assessment of protectiveness should be completed by late 2008. This protectiveness assessment should be documented in an addendum to this Report.

The Second Five Year Review identified insufficient information to determine whether the remedial action taken at OUB Marine with respect to mercury in sediment was protective for subsistence harvesters ingesting seafood from Sinclair Inlet. The recommendation section called for the collection of additional information in order to perform a risk evaluation that would support a protectiveness determination of the remedy with respect to mercury concentrations in sediment and fish tissue. This addendum addresses both the mercury issue and the protectiveness statement for OU B Marine.

Progress since the Second Five-Year Review Completion Date

OU B Marine is composed of all of the near shore marine environment associated with the BNC, reaching generally east and west along the shorelines of OUs A, NSC, and B Terrestrial and extending an average of approximately 1,500 feet outward into Sinclair Inlet. The site includes a total of approximately 270 acres of sub-tidal land.

The remedial investigation concluded that the primary threat posed by conditions within OU B Marine was human health risk associated with the presence of polychlorinated biphenyls (PCBs) in marine tissues. PCBs found in shallow marine sediments are believed to be retained in the tissues of benthic invertebrates, transfer up the food chain and bio-accumulate in tissues when these invertebrates are consumed by higher order marine species. Potential risks to subsistence seafood consumers by PCB levels measured in English sole constituted the basis for the marine remedy. The Remedial Action Objective (RAO) of reducing the concentration of PCBs in sediment to below the Minimum Cleanup Level (MCUL) in the biologically active zone within OU B Marine was established as a measure expected to reduce PCBs in fish tissue over time.

Construction of the OU B Marine remedy was initiated prior to the first 5-year review in 2002, and the final component of the remedy was completed in March 2004. The primary remedy components included dredging and disposal of contaminated sediments, placement of a clean cap over other contaminated sediments, and placement of a thin layer of clean sediments in one area for enhanced natural recovery (ENR). The dredged sediments were disposed of in an excavated seafloor confined disposal pit and capped with clean materials. The remedy also included shoreline stabilization measures at a location in the center of the BNC shoreline where slumping is believed to have occurred. The remedy also relies on ongoing processes of natural sediment recovery. Post-remedy monitoring of OU B Marine was initiated in 2003, and a second monitoring round was carried out in 2005. Marine sediments were sampled in both rounds, whereas English sole and sea cucumber tissues were sampled only in 2003. The 2003 monitoring also included bathymetric surveys, sub-bottom profiling, and sediment profile imaging to verify the persistence and condition of the disposal pit and cap/ENR remedy components. Inspection measures included in the 2005 monitoring consisted of bathymetric surveys and sub-bottom profiling. Full assessment of the functionality of the OU B Marine remedy was dependent on a sufficiently robust data set to allow statistically significant trend analysis for COCs in sediment. Sufficient data were expected to be available following the 2007 marine monitoring event, and the Second Five Year Review report included a recommendation to re-evaluate OU B Marine remedy functionality when those data became available.

Completion of the 2007 marine monitoring was delayed by a formal dispute under the Federal Facilities Agreement by the Washington State Department of Ecology regarding compliance assessment. After resolution of the dispute, the 2007 Monitoring Report was finalized in July 2009. Reference (a) to this addendum, provides results of the 2007 OU B Marine monitoring. This report concludes that the median geomean PCB concentration within OU B Marine decreased between 2005 and 2007. Trend analysis on the three rounds of post-remedy sediment monitoring results predicted that the cleanup goal of 3 mg/kg OC for OU B Marine could be achieved by approximately 2012.

Reference (b) provides preliminary results of the 2010 OU B Marine monitoring. This report concludes that the median geomean PCB concentration within OU B Marine continues to decrease since 2007, and predicts reaching a value near the end of 2010 that is consistent with the cleanup goal of 3 mg/kg OC, well ahead of the 2014 target date specified by the ROD.

However, since the completion of the OU B Marine ROD, new information regarding the original Remedial Investigation risk assessment assumptions became available that could potentially affect the protectiveness of the remedy. A risk evaluation of mercury for sediment and seafood collected from Sinclair Inlet was conducted to fulfill a recommendation from the Second Five Year Review report to address continued uncertainty regarding the seafood consumption pathway and to incorporate new data related to subsistence harvester exposure parameters. Although exposure parameters were updated, the risk evaluation was based on existing sediment and tissue data collected within the last ten years for both Sinclair Inlet and selected reference sites.

Reference (c) is the Technical Memorandum (Tech Memo) that provides the human health risk evaluation of mercury for sediment and seafood. The Tech Memo concludes if seafood is consumed at 95th percentile Suquamish consumption rates, the mercury Hazard Quotients (HQs) for total seafood consumption exceed the target health goal of 1 in both Sinclair Inlet and non-urban reference areas of Puget Sound, The HQs for Sinclair Inlet are 9 for both adults and children. HQs for the reference areas are 4 for both adults and children. The incremental (Sinclair Inlet minus reference area) HQ is 5 if rockfish concentrations are not age-adjusted; the incremental HQ is 4 if rockfish concentrations are age-adjusted.

For subsistence exposure scenarios, Sinclair Inlet hazards are driven by rockfish in the pelagic fish seafood group, followed by shellfish and then salmon. The potential increased hazards to tribal children consuming seafood containing both mercury and PCBs are also of concern. This analysis suggests mercury should be considered a chemical of concern for BNC.

The Tech Memo also identifies significant assumptions in the data sets and exposure assumptions that, if changed, would have an impact on the total incremental hazards above the non-urban reference areas and thus the conclusions of the risk evaluation. For example, the risk evaluation assumed that 100 percent of seafood consumed is harvested from Sinclair Inlet, that mercury concentrations in migratory salmon collected from Sinclair Inlet are due entirely to sediment concentrations in Sinclair Inlet, that the rockfish habitat in Sinclair Inlet could support tribal consumption, and that existing data represent current conditions. Given these assumptions and other uncertainties associated with the conclusions of the Tech Memo, the Navy plans to collect additional data to reduce the uncertainties and supplement the findings in the Tech Memo. This additional data collection would then support a focused feasibility study, which the Navy is planning to perform to both document all the mercury studies and information, and identify and evaluate potential approaches for reducing human health risks from mercury contamination in Sinclair Inlet.

Issues and Recommendations

The following issues, recommendations and follow-up actions are identified as a result of Reference (c). Item numbers are a continuation from the Second Five Year Report.

Item No.	Issue	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
OU B Marine Issues			
19	Mercury poses a potentially unacceptable risk to human health but there is insufficient data to more accurately assess human health risk given current conditions	No	Yes
20	Mercury cleanup levels were not established in the OUB Marine ROD	No	Yes

Item No.	Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
OU B Marine Recommendations						
19a	Collect additional data to reflect current conditions in Sinclair Inlet and reduce uncertainties associated with the data that was used for the Technical Memorandum. This will ensure the Navy has sufficient and accurate data: 1) to evaluate site risks; 2) to determine whether we need to do additional work to reduce mercury risk, and 3) to accurately measure, during after action monitoring, whether progress\improvements have been made from the baseline in reducing mercury risk. .	Navy	EPA Ecology	December 2012	No	Yes
19b	If data supports, perform a focused feasibility study to document and collate all studies related to mercury in sediments and identify and evaluate potential approaches for reducing human health risks from mercury contamination in Sinclair Inlet.			June 2013		
20	If data supports, develop a ROD amendment or Explanation of Significant Differences to address mercury as a contaminant of concern, select cleanup levels and select the preferred alternative of the focused feasibility study.	Navy	EPA Ecology	December 2013	No	Yes

Protectiveness Statement

Based on new information and/or actions taken since the Second Five-Year Review completion date, the protectiveness statement for OU B Marine is revised as follows:

> The original reasons for deferring the protectiveness determination for OU B Marine in the Second Five Year Report have been resolved. Recent monitoring and trend analysis indicates the PCB sediment clean up goal for OU B Marine will be achieved ahead of the 2014 target date specified by the ROD.

However, the review of the human health risk evaluation associated with mercury has concluded that Hazard Quotients exceed the target goal of 1 for seafood consumption in Sinclair Inlet at tribal consumption rates and mercury should be considered a chemical of concern for BNC. Additional data collection is needed to reflect current conditions in Sinclair Inlet and reduce uncertainties associated with the data that was used for the Technical Memorandum. If data supports, a focused feasibility study will be conducted that specifically addresses mercury contamination in Sinclair Inlet and potential approaches for reducing human health risks associated with mercury. Since there is insufficient data and a need for additional work, the protectiveness determination for OU B Marine is therefore deferred until the next Five Year Review.

Next Five-Year Review

The next five-year review will be completed by 21 October 2012.

Date 9 | 13 | 2011

Captain P.M. Dawson
Commanding Officer, Naval Base Kitsap

References:

a. 2007 Marine Monitoring Report dated 2 July 2009
b. 2010 Marine Monitoring Report (Draft) dated 20 January 2011
c. Technical Memorandum, Human Health Risk Evaluation of Mercury in Sinclair Inlet Seafood dated 12 August 2010.